

Attorney's Docket No.: 00786-292002 / MGH 60:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Miller, S. I.

Art Unit : 1641

Serial No. : 09/068,804

Examiner : Padma Basker

Filed : May 14, 1998

Title : SALMONELLA SECRETED PROTEINS AND USES THEREOF

Assistant Commissioner for Patents

Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. § 1.131

I, Samuel Miller, declare as follows:

1. I am the sole inventor of the subject matter claimed in the patent application identified above.
2. The specification of the present application discloses that part of an EcoRI subclone of pVV8-1 was sequenced and four open reading frames were identified (p. 50, lines 10-14). The gene products of the open reading frames were designated sspB, sspC, sspD, and sspA. Prior to July 8, 1995, sequencing of the open reading frames produced the sequence in the attached document which was prepared prior to July 8, 1995. There are some errors in this sequence. However, prior to July 8, 1995, additional sequencing of the same clone led to the sequences of SspB, SspC, SspD, and SspA shown in Figures 19-28 of the present application.
3. I hereby declare that all statements made herein of my own knowledge are true and that all statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment.

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

I hereby certify under 37 CFR §1.8(a) that this correspondence, deposited with the United States Postal Service as first class, has sufficient postage on the date indicated below and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20514.

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Signature _____

Typed or Printed Name of Person Signing Certificate

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both, under Section 1001 of Title 18 of the United States Code and the
willful false statements may jeopardize the validity of the application
patents issued therefrom.



Samuel I. Miller, M.D.

FEB 13, 2001

Date

74f+74rc+71r-5/12-strider -> 3-phase Translation

DNA sequence 3403 b.p. CGCAAAGCCGAG ... CCACGAATCTGT linear

/ 1 31 / 11
 GGC AAA GCC GAG GAA ACG AAC CGC ATT ATG GGA TGT ATC GGG AAA GTC CTC GCG GCG CTG
 arg lys ala glu glu thr asn arg ile met gly cys ile gly lys val leu gly ala leu
 ala lys pro arg lys arg thr ala leu trp asp val ser gly lys ser ser ala arg cys
 gln ser arg gly asn glu pro his tyr gly met tyr arg glu ser pro arg arg ala ala
 61 / 21 91 / 31
 CTA ACC ATT GTC AGC CTT GTG GCC GCT GTT TTT ACC GGT GGG GCG AGT CTG GCG CTG GCT
 leu thr ile val ser val val ala ala val phe thr gly gly ala ser leu ala leu ala
 OCH pro leu ser ala leu trp pro leu phe leu pro val gly arg val trp arg trp leu
 asn his cys gln arg cys gly arg cys phe tyr arg trp gly glu ser gly ala gly cys
 121 / 41 151 / 51
 GCG GTG GCA CTT CCG GTA ATG CTC GCC GAT GAA ATT GTG AAG GCG GCG ACG GGA GTG TCG
 ala val gly leu ala val met val ala asp glu ile val lys ala ala thr gly val ser
 arg trp asp leu arg OCH trp trp pro met lys leu OPA arg arg arg arg glu cys arg
 gly gly thr cys gly asn gly gly arg OPA asn cys glu gly gly asp gly ser val val
 181 / 61 211 / 71
 TTT ATT CAG CAG GCG CTA AAC CCG ATT ATG GAG CAT CTC CTG AAG CCG TTA ATC GAG CTG
 phe ile gln gln ala leu asn pro ile met glu his val leu lys pro leu met glu leu
 leu phe ser arg arg OCH thr arg leu trp ser met ser OPA ser arg OCH trp ser OPA
 tyr ser ala gly ala lys pro asp tyr gly ala cys pro glu ala val asn gly ala asp
 241 / 81 271 / 91
 ATT GGC AAG GCG ATT ACC AAA GCG CTG GAA GGA TTA GGC GTC GAT AGA AAA CCG CAG AGA
 ile gly lys ala ile thr lys ala leu glu gly leu gly val asp arg lys arg gln arg
 leu ala arg arg leu pro lys arg trp lys asp AMB ala ser ile glu asn gly arg asp
 trp gln gly asp tyr gln ser ala gly arg ile arg arg arg AMB lys thr ala glu met
 301 / 101 331 / 111
 TGG CCG GCA GCA TTG TTG GTG CGA TTG TCG CCG CTA TCC CAT GGT GAC GCG GTC ATT GTG
 trp pro ala ala leu leu val arg leu ser pro leu cys his gly asp ala val ile val
 gly arg gln his cys trp cys asp cys arg arg tyr ala met val thr arg ser leu trp
 ala gly ser ile val gly ala ile val ala ala met pro trp OPA arg gly his cys gly
 361 / 121 391 / 131
 ATG GTC GCA CTT GTC GGG AAA GGC GCG GCG GCG AAA CTG GGT AAC GCG CTG AGC AAA ATG
 val val ala val val gly lys gly ala ala ala lys leu gly asn ala leu ser lys met
 trp ser gln leu ser gly lys ala arg arg arg asn trp val thr arg OPA ala lys OPA
 gly arg ser cys arg glu arg arg gly gly glu thr gly OCH arg ala glu gln asn asp
 421 / 141 451 / 151
 ATG GGC GAA ACG ATT AAG AAG TTG GTG CCT AAC GTG CTC AAA CAG TTG GCG CAA AAC GGC
 met gly glu thr ile lys lys leu val pro asn val leu lys gln leu ala gln asn gly
 trp ala lys arg leu arg ser trp cys leu thr cys OPA asn ser trp arg lys thr ala
 gly arg asn asp OCH glu val gly ala OCH arg ala glu thr val gly ala lys arg gln
 481 / 161 511 / 171
 AGC AAA CTC TTT ACC CAG GCG ATG CAA CGT ATT ACT AGC GGT CTG GGT AAT GTG GGT AGC
 ser lys leu phe thr gln gly met gln arg ile thr ser gly leu gly asn val gly ser
 ala asn ser leu pro arg gly cys asn val leu leu ala val trp val met trp val ala
 gln thr leu tyr pro gly asp ala thr tyr AMB arg ser gly OCH cys gly AMB gln
 541 / 181 571 / 191
 AAG ATG GGC CTG CAA ACG AAT GCC TTA AGT AAA GAG CTG GTA GGT AAT ACC CTA AAT AAA
 lys met gly leu gln thr asn ala leu ser lys glu leu val gly asn thr leu asn lys
 arg trp ala cys lys arg met pro OCH val lys ser trp AMB val ile pro OCH ile lys
 asp gly pro ala asn glu cys leu lys OCH arg ala gly arg OCH tyr pro lys OCH ser
 601 / 201 631 / 211
 GTG GCG TTG GGC ATG GAA GTC ACG AAT ACC GCA GCC CAG TCA GCC GGT GGT GTT GCC GAG
 val ala leu gly met glu val thr asn thr ala ala gln ser ala gly gly val ala glu
 trp arg trp ala trp lys ser arg ile pro gln pro ser gln pro val val leu pro arg
 gly val gly his gly ser his glu tyr arg ser pro val ser arg trp cys cys arg gly
 661 / 221 691 / 231
 GGC GTA TTT ATT AAA AAT GCC AGC GAG GCG CTT GCT GAT TTT ATG CTC GCC CGT TTT GCC
 gly val phe ile lys asn ala ser glu ala leu ala asp phe met leu ala arg phe ala
 ala tyr leu leu lys met pro ala arg arg leu leu ile leu cys ser pro val leu pro
 arg ile tyr OCH lys cys gln arg gly ala cys OPA phe tyr ala arg pro phe cys his
 721 / 241 751 / 251
 ATG GAT CAG ATT CAG CAG TGG CTT AAA CAA TCC GTA GAA ATA TTT GGT GAA AAC CAG AAG
 met asp gln ile gln gln trp leu lys gln ser val glu ile phe gly glu asn gln lys
 trp ile arg phe ser ser gly leu asn asn pro AMB lys tyr leu val lys thr arg arg
 gly ser asp ser ala val ala OCH thr ile arg arg asn ile trp OPA lys pro glu gly

B
↓

781 / 261

GTA ACC GCG GAA CTG CAA AAA GCC A TCT TCT GCG GTA CAG CAA AAT GCG GAT C TCG
val thr ala glu leu gln lys ala met ser ser ala val gln gln asn ala asp ala ser
OCH arg arg asn cys lys lys pro cys leu leu arg tyr ser lys met arg met leu arg
asn gly gly thr ala lys ser his val phe cys gly thr ala lys cys gly cys phe ala

841 / 281

COT TTT ATT CTG CGC CAG AGT CGC GCA TAA AAA CTG GGA AAA TAA AGG CAG AAA AAT ATG
rg phe ile leu arg gln ser arg ala OCH lys leu pro lys OCH arg glu lys asn met
val leu phe cys ala arg val ala his lys asn cys gln asn lys gly arg lys ile cys
phe tyr ser ala pro glu ser arg ile lys thr ala lys ile lys gly glu lys tyr val

901 / 301

TTA ATT AGT AAT GTG CGA ATA AAT CCC GCC GCT TAT TTA AAT AAT CAT TCT GTT GAG AAT
leu ile ser asn val gly ile asn pro ala ala tyr leu asn his ser val glu asn
OCH leu val met trp glu OCH ile pro pro leu ile OCH ile ile ile leu leu arg ile
asn AMB OCH cys gly asn lys ser arg leu phe lys OCH ser phe cys OPA glu AMB

961 / 321

AGT TCA CAG ACA GCT TCG CAA TCC GTT AGC GCT AAA GAT ATT CTG AAT AGT ATT GGT ATT
ser ser gln thr ala ser gln ser val ser ala lys asp ile leu asn ser ile gly ile
val his arg gln leu arg asn pro leu ala leu lys ile phe OPA ile val leu val leu
phe thr asp ser phe ala ile arg AMB arg OCH arg tyr ser glu AMB tyr trp tyr AMB

1021 / 341

AGC AGC AGT AAA GTC AGT GAC CTC GCG TTG AGT CCT ACA CTG AGC GCG CCT GCG AGC GGT
ser ser ser lys val ser asp leu gly leu ser pro thr leu ser ala pro ala arg gly
ala ala val lys ser val thr trp gly OPA val leu his OPA ala arg leu arg gly val
gln gln OCH ser gln OPA pro gly val glu ser tyr thr glu arg ala cys glu gly tyr

1081 / 361

ATT AAC GCA AAC CCC CGG AAC GAT CAC GTC CTT TTT AAA AGC CAG TAT TCA AAA TAC CGA
ile asn ala asn pro arg asn asp his val leu phe lys ser gln tyr ser lys tyr arg
leu thr gln thr pro gly thr ile thr ser phe leu lys ala ser ile gln asn thr asp
OCH arg lys pro pro glu arg ser arg pro phe OCH lys pro val phe lys ile pro thr

1141 / 381

CAT GAA TCA GGA TTT GAA TGC TCT GGC AAA TAA TGT CAC GAC TAA AGC GAA TGA GGT TGT
his glu ser gly phe glu cys ser gly lys OCH cys his asp OCH ser glu OPA gly cys
met asn gln asp leu asn ala leu ala asn asn val thr thr lys ala asn glu val val
OPA ile arg ile OPA met leu trp gln ile met ser arg leu lys arg met arg leu cys

1201 / 401

GCA AAC CCA GTT ACG CGA GCA GCA GCG AGA AGT CGG AAA GTT TTT TGA TAT TAG CCC AAT
ala asn pro val thr arg ala ala gly arg ser arg lys val phe OPA tyr AMB arg asn
gln thr gln leu arg glu gln gln ala glu val gly lys phe phe asp ile ser gly met
lys pro ser tyr ala ser ser arg gln lys ser glu ser phe leu ile leu ala glu cys

1261 / 421

GTC TTC CAG TGC CGT TGC GCT GTT GGC TGC CGC GAA TAC GTT AAT GCT GAC GTT GAA CCA
val phe gln cys arg cys ala val gly cys arg glu tyr val asn ala asp val glu pro
ser ser ser ala val ala leu leu ala ala ala asn thr leu met leu thr leu asn gln
leu pro val pro leu arg cys trp leu pro arg ile arg OCH cys OPA arg OPA thr arg

1321 / 441

GGC TGA TAG CAA ACT GTC TGG TAA GTT GTC ATT AGT CAG TTT TGA TGC AGC TAA AAC gac
gly OPA AMB gln thr val trp OCH val val ile ser gln phe OPA cys ser OCH asn asp
ala asp ser lys leu ser gly lys leu ser leu val ser phe asp ala ala lys thr thr
leu ile ala asn cys leu val ser cys his AMB ser val leu met gln leu lys arg arg

1381 / 461

ggc aag ctc cat gat gcg cga agg gat gaa tgg ttg tgg gta gta ttc cag agc cga gga
gly lys leu his asp ala arg arg asp glu ser leu ser val val phe gln arg gln gly
ala ser ser met met arg glu gly met asn arg cys arg AMB tyr ser arg gly lys gly
gln ala pro OPA cys ala lys gly OPA ile val val gly ser ile pro glu ala arg gly

1441 / 481

ggg
gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly leu arg met gly
gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly ser val trp gly
gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly gly ala pro tyr gly glu

1501 / 501

agg atg atg cgt tgg ccg gta gta ttt ccc aga gtc gct tca gtt ggg gat cac tgg cgt
arg met met arg trp pro val val phe pro arg ala ala ser val gly asp his trp arg
gly OPA cys val gly arg AMB tyr phe pro glu pro leu gln leu gly ile thr gly val
asp asp ala leu ala gly ser ile ser gln ser arg phe ser trp gly ser leu ala trp

1561 / 521

ggg cgc CAA ACT GGA ATA TAA GGC GCT GCA CAA TGA AAG AGG ccc cct TAA ACA TAA TGC
gly arg gln thr gly ile OCH gly ala ala glu OPA lys arg pro pro OCH thr OCH cys
gly ala lys leu glu tyr lys gly leu gln asn glu arg gly pro leu lys his asn ala
ala pro asn trp asn ile arg gly cys arg met lys glu ala pro leu asn ile met pro

1621 / 541

CGG GAA GAT CGA TAA ACT GAC CAC TGA AAG CCA CAG TAT TAA AAA CGT GCT GAA CGG GCA

Begining of

1223B

INSERT C

arg glu asp arg OCH thr asp his OPA pro gln tyr OCH lys arg ala glu arg ala
 gly lys ile asp lys leu thr thr ser his ser ile lys asn val leu asn gln
 gly arg ser ile asn OPA pro leu lys ala thr val leu lys thr cys OPA thr gly arg
 1681 / 561 1711 / 571
 GAA TAG CAT CAA ACT CGG TGC TGA AGG CGT CGA TTC TCT GAA ATC GTT AAA TAT GAA GAA
 glu AMB his gln thr arg cys OPA arg arg phe ser glu ile val lys tyr glu glu
 asn ser ile lys leu gly ala glu gly val asp ser leu lys ser leu asn met lys lys
 ile ala ser asn ser val leu lys ala ser ile leu OPA asn arg OCH ile OPA arg lys
 1741 / 581 1771 / 591
 AAC CGG TAC CGA TGC GAC GAA AAA TCT TAA TGA TGC GAC GCT TAA ATC TAA TGC CGG AAC
 asn arg tyr arg cys asp glu lys ser OCH OPA cys asp ala OCH ile OCH cys arg asn
 thr gly thr asp ala thr lys asn leu asn asp ala thr leu lys ser asn ala gly thr
 pro val pro met arg arg lys ile leu met met arg arg leu asn leu met pro glu pro
 1801 / 601 1831 / 611
 CAG CGC CAC CGA AAG TCT GGG TAT TAA AGA CAG TAA TAA ACA AAT CTC CCC TGA ACA TCA
 gln arg his gly lys ser gly tyr OCH arg gln OCH OCH thr asn leu pro OPA thr ser
 ser ala thr glu ser leu gly ile lys asp ser asn lys gln ile ser pro glu his gln
 ala pro arg lys val trp val leu lys thr val ile asn lys ser pro leu asn ile arg
 1861 / 621 1891 / 631
 GGC TAT TCT GTC GAA ACG TCT TGA GTC TGT CGA ATC CGA TAT TCG Tct TGA GCA GAA TAC
 gly tyr ser val glu thr ser OPA val cys arg ile arg tyr ser ser OPA ala glu tyr
 ala ile leu ser lys arg leu glu ser val glu ser asp ile arg leu glu gln asn thr
 leu phe cys arg asn val leu ser leu ser asn pro ile phe val leu ser arg ile pro
 1921 / 641 1951 / 651
 CAT CGA TAT GAC CCG AAT CGA TGC GCG CAA GAT CGA GAT GAC GCG CGA TCT GAT TAT GAA
 his gly tyr asp pro asn arg cys ala gln asp ala asp asp gly arg ser asp tyr glu
 met asp met thr arg ile asp ala arg lys met gln met thr gly asp leu ile met lys
 trp ile OPA pro glu ser met arg ala arg cys arg OPA arg ala ile OPA leu OPA arg
 1981 / 661 2011 / 671
 GAA CTC GGT CAC GGT CGG TGG TAT TGC AGG GGC GTC CGG CCA GTA CGC CGC TAC TCA GGA
 glu leu gly his gly arg trp tyr cys arg gly val arg ala val arg arg tyr ser gly
 asn ser val thr val gly gly ile ala gly ala ser gly gln tyr ala ala thr gln glu
 thr arg ser arg ser val val leu gln gly arg pro gly ser thr pro leu leu arg asn
 2041 / 681 2071 / 691
 ACG TTC CGA GCA GCA AAT TAG CCA GGT GAT AAC CGG GTT GCC AGC ACC CCA TCG GAC GAA
 thr phe arg ala ala asn AMB pro gly asp asn arg val ala ser thr ala ser asp glu
 arg ser glu gln gln ile ser gln val ile thr gly leu pro ala pro his arg thr lys
 val pro ser ser lys leu ala arg OPA OCH pro gly cys gln his arg ile gly arg ser
 101 / 701 2131 / 711
 CCC CGT GAA AGT TCA CGT AAA TCG ACC AGC CTG ATT CAG GAA ATG CTG AAA ACA ATG GAG
 ala arg glu ser ser arg lys ser thr ser leu ile gln glu met leu lys thr met glu
 pro val lys val his val asn arg pro ala OPA phe arg lys cys OPA lys gln trp arg
 pro OPA lys phe thr OCH ile asp gln pro asp ser gly asn ala glu asn asn gly glu
 2161 / 721 2191 / 731
 AGC ATT AAC CAG TCG AAA GCA TCC GCA CTC GCT CGT ATC GCA GGC AAT ATT CGC GCT TAA
 ser ile asn gln ser lys ala ser ala leu ala arg ile ala gly asn ile arg ala OCH
 ala leu thr ser arg lys his prq his ser leu val ser gln ala ile phe ala leu asn
 his OCH pro val glu ser ile arg thr arg ser tyr arg arg gln tyr ser arg leu ile
 2221 / 741 2251 / 751
 TCT GAA AGG TCA TCT ATA CGC CAT CAT GGG TGT GAT TTA ATC GCG CTC CTG ATG GCG AAC
 ser glu arg ser ser ile arg his his gly cys asp leu ile ala leu leu met ala asn
 leu lys gly his leu tyr ala ile met gly val ile OCH ser arg ser OPA trp arg thr
 OPA lys val ile tyr thr pro ser trp val OPA phe asn arg ala pro asp gly glu leu
 2281 / 761 2311 / 771
 TGG GGA TAT TAT GCT TAA TAT TCA AAA TTA TTC CGC TTC TCC TCA TCC CGG GAT CGT TCC
 trp gly tyr tyr ala OCH tyr ser lys leu phe arg phe ser ser ser gly asp arg cys
 gly asp ile met leu asn ile gln asn tyr ser ala ser pro his pro gly ile val ala
 gly ile leu cys leu ile phe lys ile ile pro leu leu leu ile arg gly ser leu pro
 2341 / 781 2371 / 791
 CGA ACG GCC GCA GAC TCC CTC GGC GAG CGA GCA CGT CGA GAC TCC CGT GGT acC GTC TAC
 arg thr ala ala asp ser leu gly glu arg ala arg arg asp cys arg gly thr val tyr
 glu arg pro gln thr pro ser ala ser glu his val glu thr ala val val pro ser thr
 asn gly arg arg leu pro arg arg ala ser thr ser arg leu pro trp tyr arg leu pro
 2401 / 801 2431 / 811
 CAC AGA ACA TCG CGC TAC AGA TAT CAT TTC ATT ATC GCA GGC GGC TAC TAA AAT CCA CCA
 his arg thr ser arg tyr arg tyr his phe ile ala gly gly tyr OCH asn pro pro
 thr glu his arg gly thr arg ile ile ser leu ser gln ala ala thr lys ile his gln
 gln asn ile ala val gln ile ser phe his tyr arg arg arg leu leu lys ser thr arg
 161 / 821 2491 / 831
 AGC ACA GCA GAC GCT GCA GTC AAC GCC ACG ATC TCT GAA GAG AAT AAT CAC GAG CGC AGC
 gly thr ala asp ala ala val asn ala thr ile ser glu glu asn asn asp glu arg ser
 ala gln gln thr leu gln ser thr pro arg ser leu lys arg ile met thr ser ala ala

end of C

Revised D

his ser arg arg cys ser gln arg asp leu OPA arg glu OCH OPA arg ala gln leu
 2521 / 841 2551 / 851
 TGG GGC CAG CAG TTG ACC AGC ACC CTG AAT GCG CTG CCG AAG TCC GGC GTG TCA TTA TCC
 trp gly gln gln leu thr ser ser leu asn ala leu ala lys ser gly val ser leu ser
 gly ala ser ser OPA pro ala ala OPA met arg trp arg ser pro ala cys his tyr pro
 gly pro ala val asp gln gln pro glu cys ala gly glu val arg arg val ile ile arg
 2581 / 861 2611 / 871
 CA GAA CAA AAT GAG AAC CTG CCG AGC GCG TTT TCT GCG CCG ACG TCG CCC TTA TTT AGC
 ala glu gln asn glu asn leu arg ser ala phe ser ala pro thr ser ala leu phe ser
 gln asn lys met arg thr cys gly ala arg phe leu arg arg arg pro tyr leu ala
 arg thr lys OPA glu pro ala glu arg val phe cys ala asp val gly leu ile AMB arg
 2641 / 881 2671 / 891
 GCT TCG CCT ATG GCG CAG CCG AGA ACA ACC ATT TCT GAT GCT GAG ATT TCG GAT ATG GTT
 ala ser pro met ala gln pro arg thr thr ile ser asp ala glu ile trp asp met val
 leu arg leu trp arg ser arg glu gln pro phe leu met leu arg phe gly ile trp phe
 phe ala tyr gly ala ala glu asn asn his phe OPA cys OPA asp leu gly tyr gly phe
 2701 / 901 2731 / 911
 TCC CAA AAT ATA TCG GCG ATA GGT GAC AGC TAT CTG GGC GTT TTT TAT GAA AAA CGT TGT
 ser gln asn ile ser ala ile gly asp ser tyr leu gly val phe tyr glu lys arg cys
 pro lys ile tyr arg arg AMB val thr ala ile trp ala phe phe met lys asn val val
 pro lys tyr ile gly asp arg OPA gln leu ser gly arg phe leu OPA lys thr leu ser
 2761 / 921 2791 / 931
 CGC AGT CTA TAC CGA TTT TTA TCA GGC CTT CAG TGA TAT TCT TTC CAA AAT GGC AGG CTG
 arg ser leu tyr arg phe leu ser gly leu gln OPA tyr ser phe gln asn gly arg leu
 ala val tyr thr asp phe tyr gln ala phe ser asp ile leu ser lys met gly gly trp
 gln ser ile pro ile phe ile arg pro ser val ile phe phe pro lys trp glu ala gly
 2821 / 941 2851 / 951
 GTT ATT ACC AGG TAA GCA CGG TAA TAC CGT TAA GCT AGA TGT TAC CTC ACT CAA AAA TGA
 val ile thr arg OCH gly arg OCH tyr arg OCH ala arg cys tyr leu thr gln lys OPA
 leu leu pro gly lys asp gly asn thr val lys leu asp val thr ser leu lys asn asp
 tyr tyr gln val arg thr val ile pro leu ser AMB met leu pro his ser lys met ile
 2881 / 961 2911 / 971
 TTT AAA CAG TTT AGT CAA TAA ATA TAA TCA AAT AAA CAG TAA TAC GTT TTA TTT CCA GGC
 phe lys gln phe ser gln OCH ile OCH ser asn lys gln OCH tyr val leu phe pro gly
 leu asn ser leu val asn lys tyr asn gln ile asn ser asn thr phe tyr phe gln ala
 OCH thr val AMB ser ile asn ile ile lys OCH thr val ile arg phe ile ser arg gln
 2941 / 981 2971 / 991
 AGT CAG TTA AAC GCA CTA GAC GGA GAC GAG AGC AGT GGC TCA GTG AAT TGA ATT TAC CGA
 er gln leu asn ala leu asp gly asp glu ser ser gly ser val asn OPA ile tyr arg
 val ser OCH thr his AMB thr glu thr arg ala val ala gln OPA ile glu phe thr glu
 ser val lys arg thr arg arg arg glu gln trp leu ser glu leu asn leu pro asn
 3001 / 1001 3031 / 1011
 ATA CCT GCC TGA AAT CTT ATT GAT CCG GTT ATG TCG TCA CCG TTG ATC TGA CGC CAT TAC
 ile ala ala OPA asn leu met asp pro val met ser ser pro leu ile OPA arg his tyr
 AMB leu pro glu ile leu trp ile arg leu cys arg his arg OPA ser asp ala ile thr
 ser cys leu lys ser tyr gly ser gly tyr val val thr val asp leu thr pro leu gln
 3061 / 1021 3091 / 1031
 AAA AAA TGG TTC AGG ATA TTG ATG GTT TAG GCG CCG GAA AAG ACT CAA AAC TCG AAA
 lys lys trp phe arg ile leu met val AMB ala arg arg glu lys thr gln asn ser lys
 lys asn gly ser gly tyr OPA trp phe arg arg ala gly lys arg leu lys thr arg asn
 lys met val gln asp ile asp gly leu gly ala pro gly lys asp ser lys leu glu met
 3121 / 1041 3151 / 1051
 TGG ATA ACG CCA AAT ATC AAG CCT GGC AGT CCG GTT TTA AAG CGC AGG AAG AAA ATA TGA
 trp ile thr pro asn ile lys pro gly ser arg val leu lys arg arg lys lys ile OPA
 gly OCH arg gln ile ser ser leu ala val gly phe OCH ser ala gly arg lys tyr glu
 asp asn ala lys tyr gln ala trp gln ser gly phe lys ala gln glu glu asn met lys
 3181 / 1061 3211 / 1071
 AAA CCA CAT TAC AGA CGC TCA CGC AAA AAT ATA GCA ATG CCA ATT CAT TGT ACG ACA ACC
 lys pro his tyr arg arg OPA arg lys asn ile ala met pro ile his cys thr thr thr
 asn his ile thr asp ala asp ala lys ile AMB gln cys gln phe ile val arg gln pro
 thr thr leu gln thr leu thr gln lys tyr ser asn ala asn ser leu tyr asp asn leu
 3241 / 1081 3271 / 1091
 TGG TAA AAG TGC TGA GCA GTA CGA TAA GTA CGA GCC TGG AAC CGC CAA AGC ATT Cct GCA
 trp OCH lys cys OPA ala val arg OCH val arg ala trp asn arg gln ser leu pro ala
 gly lys ser ala glu gln tyr asp lys tyr glu pro gly thr ala lys ala phe leu gln
 val lys val leu ser ser thr ile ser thr ser leu glu pro pro lys pro ser cys lys
 3301 / 1101 3331 / 1111
 AGG ATA ACA GAA GAG GAT ATT ATT GGT TAC AAG TGT AAG GAC TCA GCC CCC CGT CAT AAT
 rg ile thr glu glu asp ile asp gly tyr lys cys lys asp ser ala pro arg his asn
 gly OGH gln lys arg ile leu met val thr ser val arg thr gln pro pro val ile met
 asp asn arg arg gly tyr OCH trp leu gln val OCH gly leu ser pro pro ser OCH cys
 3361 / 1121 3391 / 1131

4

LUB-17
 ST-17
 50A

GCC AGG TAG TCA GAC CGA GAT CAA AAG GCG GCC ACG AAT CTG
ala arg AMB ser asp arg asp gln asp ala ala thr asn leu
pro gly ser gln thr glu ile lys thr arg pro arg ile
gln val val arg pro arg ser lys arg gly his glu ser

5

74f+74rc+71r-5/12-strider (898 to 2120) --> 3-phase Translation

NA sequence 3303 b.p. CGCAAAGCCGAG ... CCACGAATCTCT linear

898 / 1 928 / 11
 ATG TTA ATT AGT AAT GTG GCA ATA AAT CCC GCC GCT TAT TTA AAT AAT CAT TCT GTT GAG
 met leu ile ser asn val gly ile asn pro ala ala tyr leu asn asn his ser val glu
 cys OCH leu val met trp glu OCH ile pro pro leu ile OCH ile ile ile leu leu arg
 val asn AMB OCH cys gly asn lys ser arg arg leu phe lys OCH ser phe cys OPA glu
 958 / 21 988 / 31
 AAT AGT TCA CAG ACA GCT TCG CAA TCC GTT AGC GCT AAA GAT ATT CTC AAT AGT ATT GGT
 asn ser ser gln thr ala ser gln ser val ser ala lys asp ile leu asn ser ile gly
 ile val his arg gln leu arg asn pro leu ala leu lys ile phe OPA ile val leu val
 AMB phe thr asp ser phe ala ile arg AMB arg OCH arg tyr ser glu AMB tyr trp tyr
 1018 / 41 1048 / 51
 ATT AGC AGC ACT AAA GTC AGT GAC CTG GGG TTG AGT CCT ACA CTC AGC GCG CCT GCG CAG
 ile ser ser ser lys val ser asp leu gly leu ser pro thr leu ser ala pro ala gln
 leu ala ala val lys ser val thr trp gly OPA val leu his OPA ala arg leu arg arg
 AMB gln gln OCH ser gln OPA pro gly val glu ser tyr thr glu arg ala cys ala gly
 1078 / 61 1108 / 71
 GGC TAT TAA CCG AAA CCC CCG CAA CGA TCA CGT CCT TTT TAA AAG CCA GTA TTC AAA ATA
 gly tyr OCH arg lys pro pro glu arg ser arg pro phe OCH lys pro val phe lys ile
 gly ile asn ala asn pro arg asn asp his val leu phe lys ser gln tyr ser lys tyr
 val leu thr gln thr pro gly thr ile thr ser phe leu lys ala ser ile gln asn thr
 1138 / 81 1168 / 91
 CCG ACA TGA ATC AGG ATT TGA ATC CTC TGG CAA ATA ATG TCA CGA CTA AAG CGA ATG AGG
 pro thr OPA ile arg ile OPA met leu trp gln ile met ser arg leu lys arg met arg
 arg his gly ser gly phe glu cys ser gly lys OCH cys his asp OCH ser glu OPA gly
 asp met asn gln asp leu asn ala leu ala asn asn val thr thr lys ala asn glu val
 1198 / 101 1228 / 111
 TTG TGC AAA CCC AGT TAC CCG AGC AGC AGG CAG AAG TCG GAA AGT TTT TTG ATA TTA GCG
 leu cys lys pro ser tyr ala ser ser arg gln lys ser glu ser phe leu ile leu ala
 cys ala asn pro val thr arg ala ala gly arg ser arg lys val phe OPA tyr AMB arg
 val gln thr gln leu arg glu gln gln ala glu val gly lys phe phe asp ile ser gly
 1258 / 121 1288 / 131
 GAA TGT CTT CCA GTG CCG TTC CGC TGT TGG CTG CCG CGA ATA CGT TAA TGC TGA CGT TGA
 glu cys leu pro val pro leu arg cys trp leu pro arg ile arg OCH cys OPA arg OPA
 asn val phe gln cys arg cys ala val gly cys arg glu tyr val asn ala asp val glu
 met ser ser ser ala val ala leu leu ala ala ala asn thr leu met leu thr leu asn
 1318 / 141 1348 / 151
 ACC AGC CTC ATA CCA AAC TGT CTG GTA AGT TGT CAT TAG TCA GTT TTG ATG CAG CTA AAA
 thr arg leu ile ala asn cys leu val ser cys his AMB ser val leu met gln leu lys
 pro gly OPA AMB gln thr val trp OCH val val ile ser gln phe OPA cys ser OCH asn
 gln ala asp ser lys leu ser gly lys leu ser leu val ser phe asp ala ala lys thr
 1378 / 161 1408 / 171
 CGA CGG CAA GCT CCA TGA TGC GCG AAG GGA TGA ATC GTT GTC GGT AGT ATT CCA GAG CCG
 arg arg gln ala pro OPA cys ala lys gly OPA ile val val gly ser ile pro glu pro
 asp gly lys leu his asp ala arg arg asp glu ser leu ser val val phe gln ser arg
 thr ala ser ser met met arg glu gly met asn arg cys arg AMB tyr ser arg ala ala
 1438 / 181 1468 / 191
 CTT CAG TTG GGG ATC ACT GGC GTG GGC GCC AAA CTG CAA TAT AAG GGG CTG CAG AAT GAA
 leu gln leu gly ile thr gly val gly ala lys leu glu tyr lys gly leu gln asn glu
 phe ser trp gly ser leu ala trp ala pro asn trp asn ile arg gly cys arg met lys
 ser val gly asp his trp arg gly arg gln thr gly ile OCH gly ala ala glu OPA lys
 1498 / 201 1528 / 211
 AGA GGC CCC CTT AAA CAT AAT GCC GGC AAG ATC GAT AAA CTG ACC ACT GAA AGC CAC AGT
 arg gly pro leu lys his asn ala gly lys ile asp lys leu thr thr glu ser his ser
 glu ala pro leu asn ile met pro gly arg ser ile asn OPA pro leu lys ala thr val
 arg pro pro OCH thr OCH cys arg glu asp arg OCH thr asp his OPA lys pro gln tyr
 1558 / 221 1588 / 231
 ATT AAA AAC GTG CTG AAC GGG CAG AAT AGC ATC AAA CTC GCT GCT GAA GGC GTC GAT TCT
 ile lys asn val leu asn gly gln asn ser ile lys leu gly ala glu gly val asp ser
 leu lys thr cys OPA thr gly arg ile ala ser asn ser val leu lys ala ser ile leu
 OCH lys arg ala glu arg ala glu AMB his gln thr arg cys OPA arg arg arg phe ser
 1618 / 241 1648 / 251
 CTG AAA TCG TTA AAT ATG AAG AAA ACC GCT ACC GAT GCG ACG AAA AAT CTT AAT GAT CCG
 leu lys ser leu asn met lys lys thr gly thr asp ala thr lys asn leu asn asp ala
 OPA asn arg OCH ile OPA arg lys pro val pro met arg arg lys ile leu met met arg
 glu ile val lys tyr glu glu asn arg tyr arg cys asp glu lys ser OCH OPA cys asp

215
 3350923

Homology (Tarts)
 HCL

ADD 2

DO
 341

21750

1678 / 261

ACC CTT AAA TCT AAT GCC GGA ACC AACC ACC GAA AGT CTG GGT ATT AAA GAC A AAT
 thr leu lys ser asn ala gly thr ser ala thr glu ser leu gly ile lys asp ser asn
 arg leu asn leu met pro glu pro ala pro arg lys val trp val leu lys thr val ile
 ala OCH ile OCH cys arg asn gln arg his gly lys ser gly tyr OCH arg gln OCH OCH

738 / 281

1768 / 291

AAA CAA ATC TCC CCT GAA CAT CAG GCT ATT CTG TCG AAA CGT CTT GAG TCT GTC GAA TCC
 lys gln ile ser pro glu his gln ala ile leu ser lys arg leu glu ser val glu ser
~~asn lys ser pro leu asn ile arg leu phe cys arg asn val leu ser leu ser asn pro~~
 thr asn leu pro OPA thr ser gly tyr ser val glu thr ser OPA val cys arg ile arg

1798 / 301

1828 / 311

GAT ATT CGT ctt GAG CAG AAT ACC ATG GAT ATG ACC CGA ATC GAT GcG GcG AAG ATG CAG
 asp ile arg leu glu gln asn thr met asp met thr arg ile asp ala arg lys met gln
 ile phe val leu ser arg ile pro trp ile OPA pro glu ser met arg ala arg cys arg
 tyr ser ser OPA ala glu tyr his gly tyr asp pro asn arg cys ala gln asp ala asp

1858 / 321

1888 / 331

ATG ACC GCG GAT CTG ATT ATG AAG AAC TCG GTC ACC GTC CGT GGT ATT GCA GGG GcG TCC
 met thr gly asp leu ile met lys asn ser val thr val gly gly ile ala gly ala ser
 OPA arg ala ile OPA leu OPA arg thr arg ser arg ser val val leu gln gly arg pro
 asp gly arg ser asp tyr glu glu leu gly his gly arg trp tyr cys arg gly val arg

1918 / 341

1948 / 351

GGG CAG TAC GCC GCT ACT CAG GAA CGT TCC CAG CAG CAA ATT AGC CAG GTG ATA ACC GGG
 gly gln tyr ala ala thr gln glu arg ser glu gln gln ile ser (gln) val ile thr gly
 gly ser thr pro leu leu arg asn val pro ser ser lys leu ala arg OPA OCH pro gly
 ala val arg arg tyr ser gly thr phe arg ala ala asn AMB pro gly asp (asn) arg val

1978 / 361

2008 / 371

TTG CCA GCA CCG CAT CCG ACC AAG CCC GTG AAA GTT CAC GTA AAT CGA CCA GCC TGA TTC
 leu pro ala pro his arg thr lys pro val lys val his val asn arg pro ala OPA phe
 cys gln his arg ile gly arg ser pro OPA lys phe thr OCH ile asp gln pro asp ser
 ala ser thr ala ser asp glu ala arg glu ser ser arg lys ser thr ser leu ile gln

2038 / 381

2068 / 391

AGG AAA TGC TGA AAA CAA TGG ACA CCA TTA ACC AGT CGA AAG CAT CCG CAC TCG CTC GTA
 arg lys cys OPA lys gln trp arg ala leu thr ser arg lys his pro his ser leu val
 gly asn ala glu asn asn gly glu his OCH pro val glu ser ile arg thr arg ser tyr
 glu met leu lys thr met glu ser ile asn gln ser lys ala ser ala leu ala arg ile

2098 / 401

CG CAG GCA ATA TTC GCG CTAA
 ser gln ala ile phe ala leu
 arg arg gln tyr ser arg
 ala gly asn ile arg ala

INSERT
 SOMETHING
 1

BEST AVAILABLE COPY